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AI

PowerVR NNAs driving the AI revolution

AI is everywhere and in everything

Whether you want smartness residing in the palm of your hand, consumer products or industrial robots, or enabled by powerful servers in the cloud, we can help you achieve your vision. We enable the smartness in your products with our PowerVR Neural Network Accelerators (NNA) and GPUs. Our NC-SDK enables seamless deployment of AI acceleration on either our hardware IP either in isolation or combined. Our NNA provides maximum efficiency with a scalable architecture which enables a wide range of smart edge and end point devices from low performance IoT to high performance RoboTaxi.

AI processors

Driving the AI revolution

PowerVR AI technology enables mobile, automotive and AIoT devices to run neural networks at speeds previously unthinkable for an edge device. This allows for real-time, in-system intelligence and 10-100x the inferencing performance of other embedded processors. Combined with PowerVR GPUs, this is the solution you don't have to wait for.

Explore PowerVR NNA

Embedded intelligence at low power

For markets like security, autonomous systems and retail, we are enabling intelligence as close to the edge as possible – at low power and low cost with our AI cores. Engineered to accelerate specific neural network applications, PowerVR NNA deliver unmatched efficiency and performance.

IMG Series4

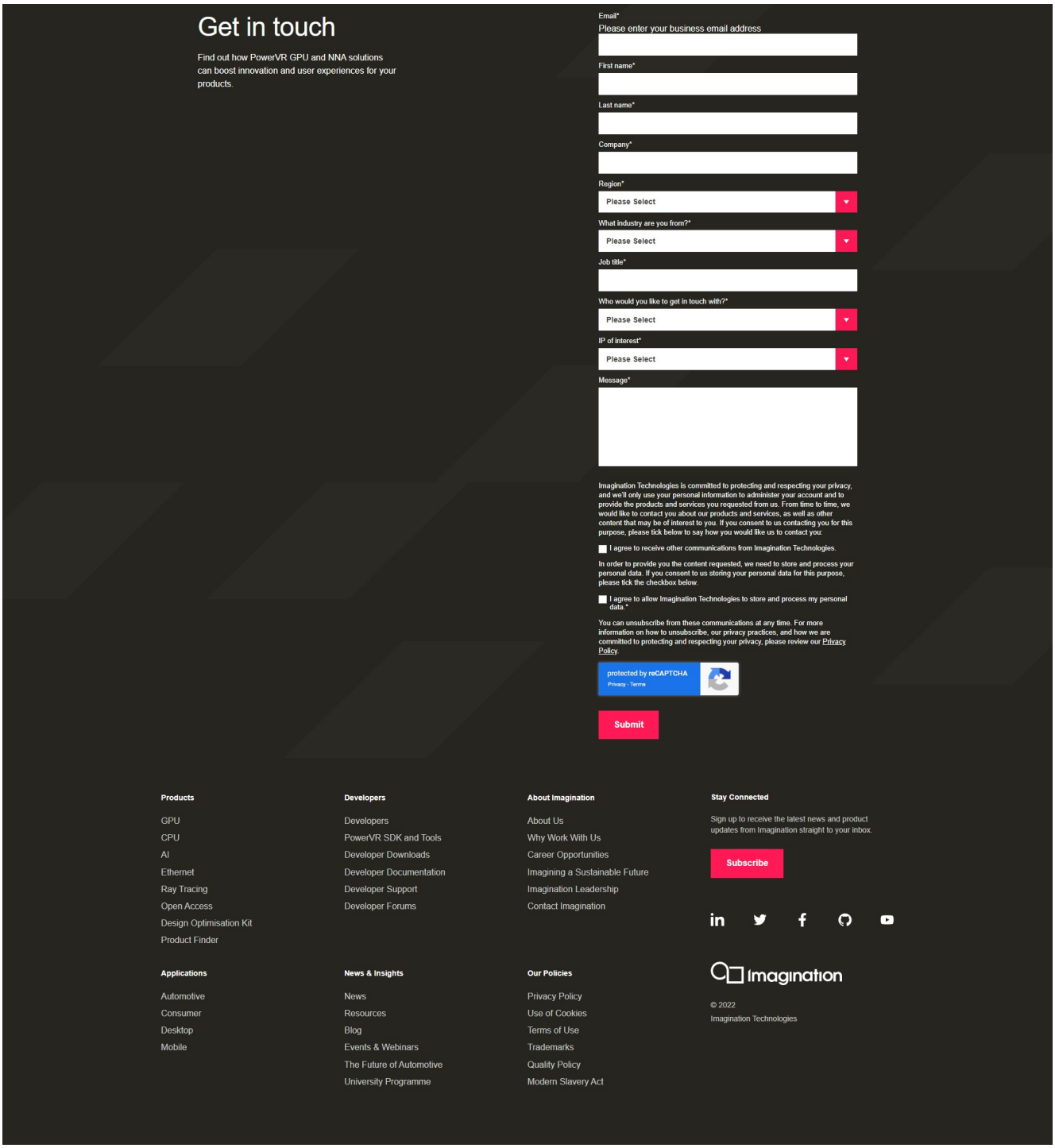
IMG Series4 is a ground-breaking neural network accelerator (NNA) for the automotive industry to enable ADAS and autonomous driving. With its incredible high performance at ultra-low latency, architectural efficiency and safety features, it has what is needed for large-scale commercial implementation.

Learn more

PowerVR Series3NX

PowerVR Series3NX is a fast, power-efficient embedded solution for hardware acceleration of neural networks. The Series3NX is a family of single scalable cores ranging from (<1mm2). Thanks to key architectural enhancements the Series3NX benefits from a 40% performance boost over the previous generation.

Learn more



Get in touch

Find out how PowerVR GPU and NNA solutions can boost innovation and user experiences for your products.

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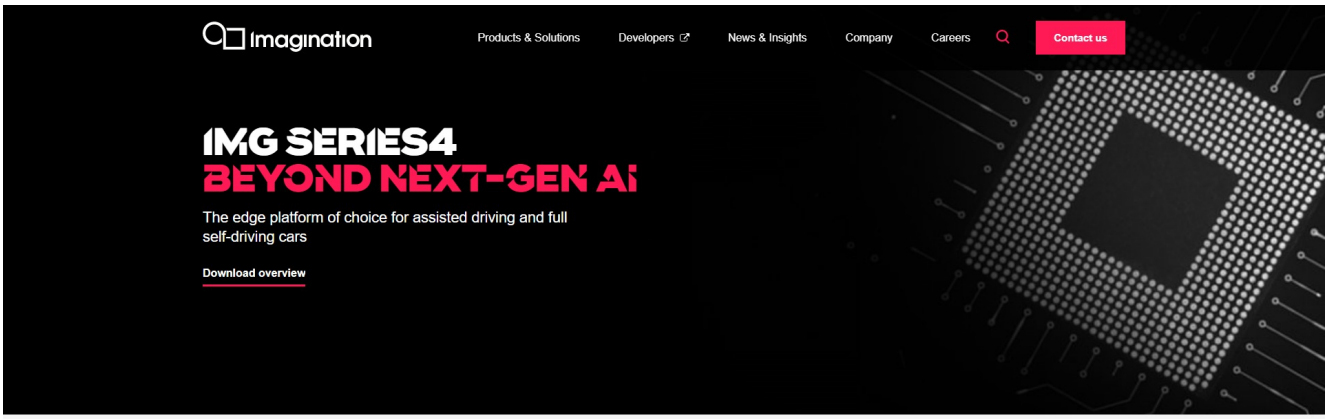


The automotive revolution

We are on the cusp of an automotive revolution. The demand for advanced driver assistance systems (ADAS) is set to triple by 2027 and still the industry is already looking to move beyond this to full self-driving cars.

Current technology deployed for testing and developing autonomous driving are physically large and very power-hungry, yet they are also underpowered in terms of performance. For large-scale commercial deployment what's needed is an "edge" solution that offers:

Automotive Safety
Learn more

Ultra-Low Latency
Learn more

Power Efficiency
Learn more

Multi-Core Flexibility
Learn more

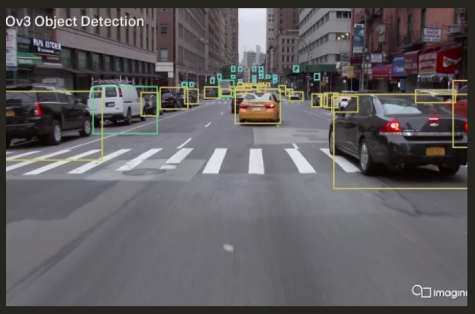
Ultra-High Performance
Learn more

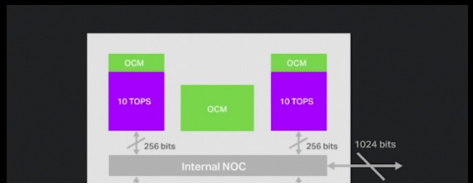
The IMG Series4

IMG Series4 is a ground-breaking neural network accelerator (NNA) for the automotive industry to enable ADAS and autonomous driving. With its incredible high performance at ultra-low latency, architectural efficiency and safety features, it has what is needed for large-scale commercial implementation.

Imagination is working with leading players and innovators in the automotive industry and the multi-core IP has already been licensed. Contact us to start your journey with IMG today.

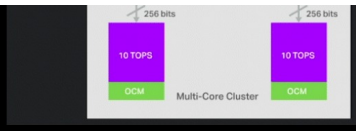
Contact us





Multi-core scalability and flexibility

Key to the incredible performance of the IMG Series4 is its multi-core capability. Available in configurations of 2, 4, 6, or 8 cores per cluster, multi-core allows for flexible allocation and synchronisation of workloads across the cores. In combination with Imagination's software, which provides fine-grained control, multiple workloads can now be executed across any number of cores in the cluster.



Ultra-low latency

Low latency enhances response time, and, on the road, this can be critical to saving lives. By combining the cores in an 8-core cluster, they can all be dedicated to executing a single task, reducing latency, and therefore response time, by a factor of eight.

Incredible performance

Maintaining high levels of utilisation with tera operations per second (TOPS) is a key metric for determining neural network performance. Thanks to its multi-core scalability, IMG Series4 outperforms other solutions on the market by an order of magnitude, with industry-leading performance metrics.

A single IMG Series4 core can deliver up to 12.5 TOPS per core at 1.2GHz in 7nm, and can be arranged in a cluster of 2, 4, 6, or 8 cores, which can be laid down in multiple clusters. An 8-cluster core is 100 TOPS and six of these laid out on a single SoC would therefore deliver 600 TOPS.

Depending on configuration, the IMG Series4 is over 100x faster than using a GPU for AI acceleration and 1000x faster than using a CPU.

100X
Faster than a GPU

1000X
Faster than a CPU

Power and bandwidth efficiency

Power efficiency is at the heart of all Imagination designs. The low silicon area IMG Series4 delivers its incredible performance of 12.5 TOPS per core at less than a watt – industry leading performance.

IMG Series4 delivers phenomenal bandwidth efficiency. Processing tensors, the complex 3D maths performed inside a neural network, requires going out to memory and back across the bus. This takes time, consumes memory bandwidth, and absorbs power.

New for IMG Series4 is Imagination Tensor Tiling (ITT) patent-pending technology that solves this problem. It efficiently packages up tensors into blocks, which are then processed in local on-chip memory. This greatly minimises data transfers between layers of the network, reducing bandwidth by up to an incredible 90%.

Download Tensor Tiling white paper

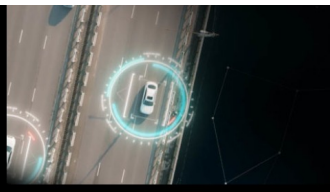
Advanced Signal Processing and FFT

We present novel techniques for executing signal processing operations such as frequency domain transforms, spectrogram generation, and mel-frequency cepstral coefficients (MFCC) extraction using massively parallel operations supported by IMG Series4 neural network accelerators (NNA). By enabling the execution of a wide variety of such operations on our NNAs, we allow audio and signal preprocessing tasks, that would otherwise have to be executed elsewhere in the system, to be executed on the same device as the neural network, which has potential to reduce overall bandwidth, power and latency requirements.

Download Advanced Signal Processing White Paper

Leading safety mechanisms

IMG Series4 includes IP-level safety features and is built using a



design process that help customers to achieve certification to ISO 26262, the industry safety standard that addresses risk in automotive electronics. Via hardware safety mechanisms that protect the compiled network, the execution of the network and the data-processing pipeline, IMG Series4 enables functionally-safe neural networks inferencing, without impacting performance.

IMG Series4 core families

IMG Series4 next-generation neural network accelerator (NNA) is ideal for advanced driver-assistance systems (ADAS) and autonomous vehicles such as robotaxis. The range of cores incorporates sophisticated technical features including Imagination Tensor Tiling, advanced safety mechanisms and intelligent workload management.

IMG 4NX-MC1

The ideal single core solution for neural network acceleration.

Learn more

IMG 4NX-MC2

The leading dual-core solution for neural network acceleration.

Learn more

IMG 4NX-MC4

The mega performance quad-core solution for neural network acceleration.

Learn more

IMG 4NX-MC6

The super-high performance hexa-core solution for neural network acceleration.

Learn more

IMG 4NX-MC8

The ultra-high performance octa-core solution for neural network acceleration.

Learn more

Imagination's three-pronged automotive solution

Automotive requires heterogeneous compute solutions: CPU, GPU, NNA and networking. The IMG Series4 NNA thus forms part of Imagination's three-pronged approach to automotive solutions.

GPU

Low-power multi-core GPUs with unprecedented performance and the industry's first to be built using ISO 26262 certifiable processes.

Learn more

NNA

Performance-ceiling busting low-power, low-area neural network accelerators that brings the automotive industry the performance it needs to enable true self-driving.

Learn more

EPP

Advanced, low-power, high-performance networking to enable next-gen automotive solutions.

Learn more

Download the IMG Series4 overview

IMG Series4 is a ground-breaking neural network accelerator for the automotive industry to enable ADAS and autonomous driving.

English

简体中文

What is the IMG Series4 NNA?

IMGIMG Series4 is a ground-breaking neural network accelerator for the automotive industry to enable ADAS and autonomous driving. Find out why IMG Series4 fulfils the remit needed for large scale commercial implementation and why it is becoming the industry-standard platform of choice for the deployment of advanced driver assistance and self-driving cars.

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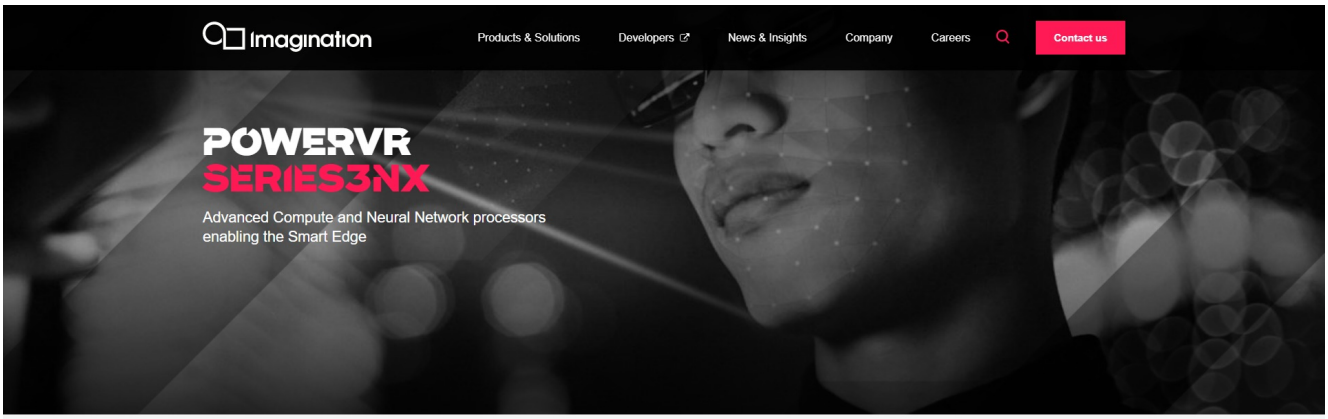


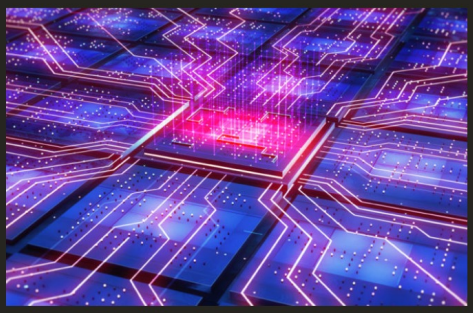
The high performance neural network inference accelerator

Neural networks are essential for complex signal processing and pattern recognition that lie behind many AI technologies. PowerVR Series3NX is a power-efficient embedded solution for hardware acceleration of neural networks. Thanks to key architectural enhancements the Series3NX benefits from a 40% performance boost over the previous generation, performing up to 10 tera operations per second (TOPS) from a single core.

AI Processors

Bringing multi-core scalability to the embedded AI market

Thanks to the scalability of PowerVR Series3NX architecture, multi-core implementations can achieve up to 160 TOPS, enabling high performance for the demanding applications. Series3NX will be available in a variety of offerings, enabling SoC manufacturers to meet a range of design targets to address multiple markets and applications.



Neural network acceleration for edge devices

As neural networks drive an explosion in technological progress across industries, NNAs are a fundamental class of processor as significant as CPUs and GPUs. By integrating a Series3NX Neural Network Accelerator (NNA), manufacturers can build devices that offer fast computation of neural networks at very low power consumption, in minimal silicon area. Offering this processing in edge devices removes the limitations of the cloud, such as bandwidth constraints, latency issues and privacy concerns.

Flexible bit-depth support

Serving as a flexible solution, the Series3NX supports neural network bit depths from 16-bit down to 4-bit, reducing bandwidth and increasing performance without compromising inference accuracy.

Lossless weight compression

Complementing its low-bit depth support, the Series3NX features a lossless weight compression scheme that reduces network model sizes and bandwidth thus increasing overall performance

Security enablement

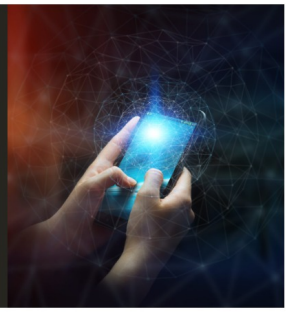
Low power consumption

The Series3NX integrates with the industry-leading security architectures with a flexible infrastructure that enables integration into custom solutions – allowing right holders to protect their content where required.

With an outstanding inference/mW, the Series3NX delivers neural network acceleration with low power consumption.

Putting the smart in smartphone

In mobile devices where a GPU is mandated, device manufacturers can pair a PowerVR Series9XE/XEP or 9XM/9XMP GPU with the Series3NX NNA in the same silicon footprint as a competing standalone GPU. Machine learning is now deployed in a wide variety of mobile applications, such as face recognition and verification, object recognition, image enhancement, style transfer and music tagging to name but a few. To support this, our Series3NX NNA cores deliver a paradigm shift in performance, while simultaneously reducing battery consumption over pure GPU solutions.



Security & surveillance

PowerVR Series3NX NNA cores enable a new class of smart camera that perform high-performance neural network-based analytics for a wide range of verticals such as commercial and home surveillance, retail analytics and drones. It supports classic use cases such as number/license plate recognition, person/object recognition, behaviour detection and perimeter defence.

Automotive (ADAS)

Convolutional neural networks (CNNs) are playing a crucial role in developing self-driving cars. The Series3NX NNAs will power advanced driver-assistance systems (ADAS) including driver alertness monitoring, driver gaze tracking, seat occupancy, road-sign detection, drivable path analysis, road user detection and driver recognition.

Augmented & Virtual reality

Neural network hardware acceleration will be critical to fulfil the potential of next-gen augmented and virtual reality use cases. Scene understanding will enhance augmented reality, while movement analysis, eye tracking and gesture recognition will provide context awareness in virtual reality to provide the best possible relative user experiences.

PowerVR Series3NX cores

The PowerVR Series3NX builds on our experience creating the groundbreaking PowerVR Series2NX neural network accelerator. The Series3NX range of cores, created from a single scalable architecture, delivers high-performance, low-power neural network acceleration in the most area efficient way, to meet a wide range of customer needs.

PowerVR AX3146

The PowerVR AX3145 is suited for more cost-sensitive devices.

Learn more

PowerVR AX3386

With 4.0 TOPS in a smaller silicon area than its predecessor.

Learn more

PowerVR AX3596

The flagship of our new range of single-core designs.

Learn more

Download the PowerVR Series3NX overview

Find out how PowerVR GPU processors can boost

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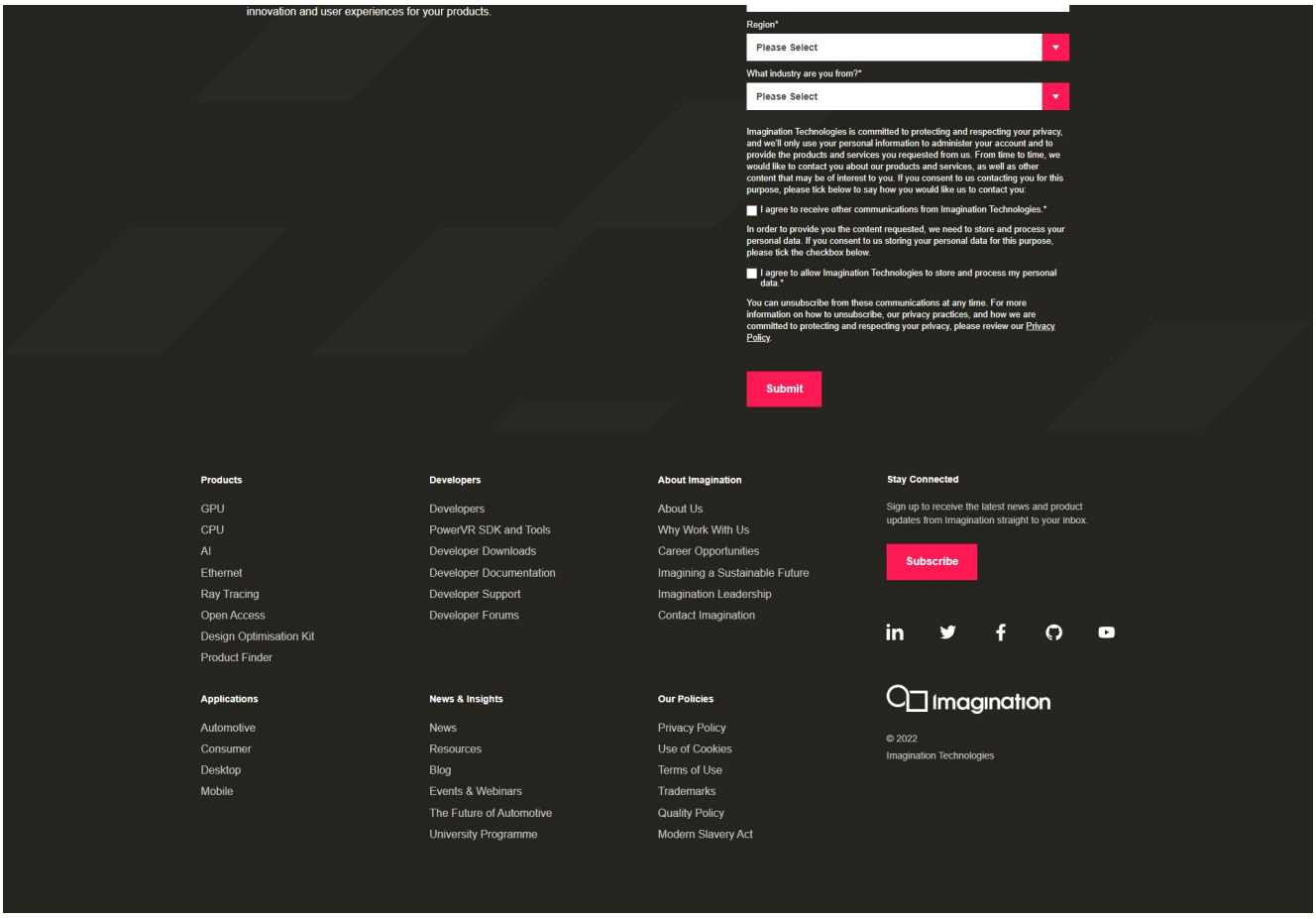
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